We claim:

1. A tunable micro lens comprising:

a first curved surface made of a first optically transparent material having a first index of refraction,

a second surface made of second optically transparent material having a second index of refraction, spaced apart from said first curved surface,

a thermo-optical polymer located between and in contact with said first and second surfaces, said polymer having a third index of refraction, different than said first index of refraction,

a temperature controller coupled to said polymer.

2. A micro lens array comprising a plurality of individual tunable micro lenses of claim 1, each of said micro lenses having parallel optical axes.

3. The tunable micro lens of claim 1 wherein said first and second optically transparent materials are the same.

4. The tunable micro lens of claim 1 wherein said second surface is curved.

5. The tunable micro lens of claim 4 wherein said first and second curves are two dimensional.

6. The tunable micro lens of claim 5 wherein said first and second curves comprise an arc of an ellipse.

7. The tunable micro lens of claim 6 wherein said first curve comprises the arc of a first ellipse and said second curve comprises the arc of a second ellipse, wherein said first ellipse is larger than said second ellipse.

8. The tunable micro lens of claim 4 wherein said first and second curved surfaces are three dimensional.

9. The tunable micro lens of claim 4 wherein said first and second curved surfaces are concave.

10. The tunable micro lens of claim 3 wherein said first and second optically transparent materials are silica.

11. The tunable micro lens of claim 1 wherein said temperature controller comprises a resistive heating element.

12. The tunable micro lens of claim 1 wherein said temperature controller comprises a Peltier device.

13. The micro lens array of claim 2 further comprising thermal barriers between adjacent micro lenses.

14. A two dimensional tunable micro lens array comprising:

a plurality of first lens bodies situated on a planar substrate, said first lens bodies made of a first optically transparent material and having a curved surface light output surface,

a plurality of corresponding second lens bodies situated on said planar substrate in spaced apart opposing relationship to said first lens bodies thereby defining a plurality of lens body pairs, wherein each said lens body pair has a gap between said first lens body and second lens body, said second lens bodies being made of the same material as said first lens bodies,

a thermo-optical polymer situated in said gaps, said thermo optical polymer having an index of refraction which is different than the index of refraction of said first optically transparent material, and

at least one temperature controller thermally coupled to said thermo-optical polymer.

15. The tunable micro lens array of claim 14 wherein said first optically transparent material comprises silica.

16. The tunable micro lens array of claim 14 wherein said planar substrate comprises silicon.

17. The tunable micro lens array of claim 14 having a plurality of temperature controllers corresponding to said plurality of lenses and having thermal barriers between at least some of the adjacent lenses.

18. The tunable micro lens array of claim 14 wherein said at least one temperature controller comprises a resistive heating element.

19. The tunable micro lens array of claim 14 wherein said at least one temperature controller comprises a Peltier device.

20. The tunable micro lens array of claim 17 wherein said plurality of temperature controllers comprise resistive heating elements.

21. The tunable micro lens array of claim 17 wherein said plurality of temperature controllers comprise Peltier devices.

22. A three dimensional tunable micro lens array comprising:

an array of curved surfaces formed on a first substantially planar substrate made of a first optically transparent material,

a second substantially planar substrate positioned in spaced apart opposing relationship to said first optically transparent substrate, thereby defining a gap between said first and second substantially planar substrates,

a thermo-optical polymer positioned in said gap, said thermo-optical material having a different index of refraction than said first optically transparent material,

a temperature controller coupled to said thermo-optical material.

23. A method of making a micro lens array, comprising:

forming a plurality of first lens elements from an optically transparent material, each of said first lens elements having a curved light output surface,

forming a plurality of second lens elements from an optically transparent material, each of said second lens elements being in spaced apart opposing relationship with a corresponding one of said first lens elements, thereby providing a plurality of lens element pairs defining gaps therebetween,

filling said gaps with a liquid thermo-optical polymer,

curing said thermo-optical polymer,

disposing a temperature controller proximate to said thermo-optical polymer.

24. The method of claim 23 wherein said first and second lens elements have elliptical surfaces and form a doubly concave lens system.

25. The method of claim 23 wherein said step of disposing a temperature controller comprises forming a resistive element.

26. The method of claim 23 wherein said step of disposing a temperature controller comprises forming a Peltier device.

27. The method of claim 23 wherein said thermo-optical polymer is selected from the group comprising ***.

28. The method of claim 23 wherein said first and second optically transparent material comprises silica.

29. A method of reducing the temperature sensitivity of a lens system comprising a plurality of lens elements, at least one of the lens elements comprising thermo optical material, comprising:

generating a plurality of curves correlating the output beam width of the lens system at selected distances from the lens system with the temperature of the lens system, taking into account the indices of refraction of the materials used in the lens system and the shape of the lens elements used in the lens system, such that each of said curves has a minima whereat the temperature sensitivity of the lens system is relatively flat, and

selecting a curve which has a minima in the vicinity of the desired operational parameters of the lens system,

constructing a lens system associated with the selected curve.

30. A method of reducing the temperature sensitivity of a lens system comprising a plurality of lens elements, at least one of the lens elements comprising thermo optical material, comprising:

choosing a desired beam width at a desired distance from the output of said lens system,

choosing a desired range of operating temperatures for said lens system,

analyzing the relationship between the parameters of the lens system and the output beam width at said desired distance for a plurality of temperatures, wherein said parameters include the shape of the lens elements, the indices of refraction of the lens materials at each of said plurality of temperatures, and the nature of the interfaces between said lens elements, and

based on said analysis, selecting parameters for said lens system which provide substantially said chosen beam width at said desired distance with the minimum amount of variability over said range of operating temperatures.